DOCUMENT RESUME

ED 476 915 PS 031 302

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TITLE	Investigating Changes in Child Behavior during Elementary School.
PUB DATE	2003-02-00
NOTE	31p.; Paper presented at the Southwest Educational Research Association Annual Conference (San Antonio, TX, February 2003).
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS
DESCRIPTORS	Aggression; Analysis of Variance; Anxiety; *At Risk Persons; Attention Control; *Behavior Change; *Behavior Problems; Child Development; Data Analysis; Depression (Psychology); Developmental Continuity; *Elementary School Students; Hyperactivity; Individual Development ; Interpersonal Competence; Leadership; Longitudinal Studies; *Personality Traits; Primary Education; Reliability; Student Adjustment; *Student Behavior; Study Skills
IDENTIFIERS	Externalization; Growth Curve Analysis; Internalization; *Person Centered Approach

ABSTRACT

This longitudinal study used repeated measures analysis of variance (RM ANOVA) and latent growth curve modeling to examine behavior change in 228 elementary school students over grades 1, 2, and 3 who varied in risk status. Of particular interest were the developmental trajectories for behaviors along four dimensions as rated yearly by teachers on the Behavioral Assessment System for Children (BASC): externalizing problems, internalizing problems, school problems, and adaptive behavior. Children were initially classified at higher or lower risk based on their behavioral type as rated by teachers, with 150 lower risk children assigned from well adapted and average types, and 78 higher risk children assigned from the following types: disruptive behavior disorders, academic problems, mild disruptive problems, physical complaints/worry, and general problems-severe. Descriptive statistics revealed slight fluctuations in the BASC dimensions over the 3 years. The RM ANOVAs showed decreases in internalizing and externalizing problems between first and second grade. The trajectory for internalizing problems showed that scores decreased from the initial baseline in a nonlinear fashion, regardless of risk level. Adaptive skills ratings showed nonsignificant decreases over time, suggesting that students were viewed as less adaptable and studious over time. School problem ratings remained constant over time, with high risk students showing higher initial status scores and showing decreases over time. Limitations of the study included its small sample size and the classification system to group children in risk categories. (Contains 21 references.) (KB)

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Investigating Changes in Child Behavior During Elementary School

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Paper presented at the Southwest Educational Research Association annual conference,

San Antonio, TX, February, 2003

Acknowledgements: We would like to acknowledge and thank Randy W. Kamphaus, Arthur M. Horne, and Jean A. Baker for their assistance and support. This project was conducted with the support of Project ACT Early and the LSU Summer Research Program.

CS 031302

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Investigating Changes in Child Behavior During Elementary School

Introduction

Over the past ten years, research on child behavior has reflected the recognition of the influence of understanding normative processes for promoting resiliency in the face of developmental change (Kamphaus & DiStefano, 2001; Masten, 2001). Newer theories have integrated biological and psychological constructs to help understand child development by illustrating the importance of studying children as represented by their individual profile of adaptation and maladaptation (Thelen, 1995).This approach has been labeled a person-oriented approach, where the focus is on understanding the characteristics of the individual, instead of variable-oriented methodologies (focusing on variable differences at the group level) which have long dominated studies of psychological development (Bergman & Magnusson, 1997).

Person-oriented research is an optimal method to study child development. How individual children change during early stages of development is of interest to understand because of its implications for identifying children for services or behavioral interventions. Further, it can give an in-depth look at various characteristics of behavior and investigate if these characteristics are relatively stable over time or subject to change as children develop.

Person-oriented research has been used to organize school children (6- 11 years) into discrete behavioral types. Research utilizing cluster analysis has identified a seven group typology of children present in U.S. classrooms as rated by teachers (Kamphaus, et al., 1997; Huberty et al, 1997). The seven types of children were reported as: Well Adapted, Average, Disruptive Behavior Disorders, Academic Problems, Mild Disruptive Problems, Physical Complaints/Worry, and General Problems--Severe. Please see Kamphaus et al. (1997) for discussion of cluster analysis and group

characteristics. This typology has been found to replicate in urban environments (DiStefano, Kamphaus, Horne & Winsor, under review), rural environments (DiStefano et al., under review) and cross-culturally (Kamphaus & DiStefano, 2001). The next step is to determine the amount of fluctuation underlying characteristics of child behavior as they develop.

Researchers know that some personality characteristics or traits are characterized by their stability over the course of a person's life (Kamphaus, 2001). The big five personality traits detailed by Tupes and Christal (1961) have formed the basis of adult personality assessment: Surgency (Introversion-Extroversion), Agreeableness, Conscientiousness, Emotional Stability, and Sophistication. However, research on children is not as common. While similar personality traits have been generalized to children (Victor, 1994: Surgency (Introversion-Extroversion), Compliance, Will to Achieve, Emotional Stability, and Sophistication), fewer studies have looked at the development of these characteristics in young children. School is an important place to study these qualities because experiences of young children at school may impact or change these behaviors. Change may occur through peer interactions, behavioral reinforcement from teachers and/or students, and implementation of social/curricular programs designed to impact behavior.

Initial attempts to understand change have investigated group classifications using a descriptive approach. In a study by Petoskey (1998), children's behavioral ratings from by two different teachers were compared to determine if a child was "classified" into the same group on successive academic years. This study took an initial look at how teachers rated student development, i.e., whether behavioral classifications were thought to be stable or changing. The study found that many students were categorized in the same group, but differences did occur, especially for children exhibiting behavioral problems. While this study provided initial information, it only examined two years of data and utilized a descriptive approach. A more

complete picture of child development can be done by utilizing a longitudinal study including multiple years of data and individualized profile information.

The multivariate approach to classification (Kamphaus & Frick, 2002) appears to also be congruent with dynamic systems theories of development. It has long been recognized that the integration of biological and psychological theories of development may produce useful theoretical frameworks (Waddington, 1942, 1971). Dynamic systems theories of child development share some of the theoretical premises of developmental biology. Specifically, developmental behavioral scientists seek to identify "pathway[s] of development" for behaviors or systems of interest, they consider these pathways to be the product of a finite number of "chreods." These chreods would describe the trajectory of average behavioral development. Also, chreods may differ depending on different types of students, such as students who are at greater risk for developing future problems displaying different developmental pathways than normal or lower risk students.

The purpose of the current study is to investigate various child behavioral characteristics to determine how they may change during formative years of education. These characteristics may be examined to determine if they are stable or change in some predictable manner. Additionally, a developmental trajectory was sought for each of the constructs as well as different growth patterns for students of varying risk. Some of the characteristics are predicted to be relatively stable across time (Internalizing/Externalizing), representing more personality traits. In these cases, it is of interest to identify the developmental trajectory for normal development versus an 'at risk' status. Other characteristics (School Problems/Adaptive skills) are unique to the school environment and its unknown how age will impact the development of these characteristics. It is of interest to determine how change may occur on these characteristics as

students progress through the primary grades and encounter the socialization and learning processes of elementary school.

Methods

Project ACT Early

Project ACT Early consisted of a 3 year grant from the Field Initiated Studies Grant Program of the Institute for At-Risk Children, Office of Educational Research and Improvement, US Department of Education (#). Beginning in 1996, the grant was implemented in the Athens-Clark County, Georgia public school system and ran through the 1999 academic year. Four elementary schools participated in the program targeting over 1,000 students total in grades K through 3. Objectives of the ACT Early grants include documentation of individual and environmental contributors to behavioral risk for students in elementary school and using this information to help teachers develop knowledge and skills to work effectively with children at high risk of poor behavioral and educational adaptation (Website: http://www.coe.uga.edu/actearly/act/actii.html).

The project studied the development of children on many variables: behavioral and social characteristics, academic achievement via classroom grades and standardized test scores, information on attendance, and occurrences of maladaptive behaviors (e.g., suspensions, disciplinary actions). Teachers and students were also instructed on programs designed to change behavior. For example, the A.C.T. Nice program, a solution-focused approach to managing children's behavior problems, was implemented.

Instrument

Near the beginning of each academic year, classroom teachers completed Behavioral Assessment System for Children (BASC) form for each child in their classroom. This instrument

provides a comprehensive measure of adaptive and problem behaviors in the elementary school setting. The BASC is used nationwide to measure behavioral and social adjustment of school-aged children and has been found to possess acceptable internal and external validity (Flanagan, 1995).

The Child form (ages 6-11) of the BASC was completed by each classroom teacher for each child (Teacher Rating Scale-Child: TRSC). The TRS-C is composed of 148 behavioral items whose occurrence are rated using a four-point Likert scale, anchored by 1 (never) and 4 (almost always). The TRS-C provides information measure a child's development along four behavioral dimensions: (1) Adaptive Skills (how students develop socially and interact with peers and authority figures), (2) Externalizing Behaviors (tendencies for students to display aggressive or hyperactive behaviors), (3) Internalizing Behaviors (tendencies for students to show feelings of anxiety, worry, or stress), and (4) School Problems (absence or presence of problems with learning and school work) (Reynolds & Kamphaus, 1998). Each dimension is measured by subscales, summed to create a dimension score. The subscales included on each dimension are reported below:

- Externalizing problems (aggression, hyperactivity, and conduct problems),
- Internalizing problems (anxiety, depression, and somatization),
- School problems (attention, learning problems), and
- Adaptive Behaviors (adaptability, social skills, leadership, and study skills).

All TRSC subscale scores are normed at a mean of 50 and a standard deviation of 10 (T-scores), used to construct individual student behavioral profiles. More information on the TRSC, dimensions, and subscales is provided in the BASC manual (Reynolds & Kamphaus, 1998).

It is noted that with the longitudinal design of the ACT Early project, different classroom teachers rated the same children across different grades. While it is recognized that individual teachers may differ in their rating of children, it is not thought to greatly affect children's ratings. The BASC has been shown to provide high evidence of inter-rater stability (Reynolds & Kamphaus, 1998).

Subjects

The students involved in the current research began working with the ACT Early project in the 1996-97 academic year when they entered first grade and were followed through third grade. The sample used consisted of 228 students with complete profiles of TRSC scores from first through third grade.

Information based upon the seven cluster typology was also available for each student at each grade level. The clustering information was used to classify students into a "risk" category. Cluster classifications of Well Adapted or Average were considered at a lower risk of developing behavioral or adaptive problems, while the remaining classifications (Learning Problems, Disruptive Behavior Problems, General Problems—Severe, and Mildly Disruptive) were considered to be indicative of moderate to higher risk for developing problems. Each student was given a classification of 'lower' or 'higher' risk by comparing cluster classifications across first through third grades. Students with a majority (2 out of 3) of cluster classifications in one of the two risk categories were assigned the according risk label. For example, a student with cluster classifications of Average, Well Adapted, Mildly Disruptive, in grades 1, 2, and 3, respectively, would be given a label of lower risk, due to the lower risk classifications (Average and Well Adapted) at two time points and only one higher risk classification (Mildly Adaptive). Of the 228 students, 150 were labeled "lower risk" and 78 categorized as "higher risk."

Descriptive information for the TRSC dimensions is provided in Table 1. Average scores in Table 1 show that there are slight fluctuations in the variables across grades. Overall descriptive information was close to 50 for each scale. However, differences were observed when risk groupings were considered. Descriptive evidence showed differences between the two risk groups, with students in the lower risk group showing fewer behavior problems and increased adaptive skills than higher risk students. Even with more subjects (N=150), lower risk students were a more homogeneous group than higher risk students.

Analysis

Various analysis strategies exist for studying change. Typical methods of studying change include pre-post test analyses, and repeated measures ANOVA, while newer methods include longitudinal panel analyses (Kessler & Greensburg, 1981) and latent growth curve modeling (LGM: Duncan, Duncan, Strycker, Li, & Alpert, 1999). Both repeated measures ANOVA and latent growth curve modeling were used to investigate change. This process allowed for an investigation of change on the observable level (repeated measures) as well as at the latent level (LGM).

Study 1: Repeated Measures

Repeated Measures ANOVA studies how observed scores change over time. To begin the study of developmental change, each dimension (Adaptability, Internalizing Behaviors, Externalizing Behaviors, and School Problems) was employed in a Repeated Measures ANOVA design. All analyses were conducted at a significance level of .05 using SPSS for Windows (version 11.0; SPSS, Inc., 2001).

Repeated Measures omnibus tests which did not meet the assumption of spherecity were corrected using the Greenhouse-Geiser application. Significant omnibus results were followed

by dependent t-tests between grade levels, using the Bonferroni experiment wise control to the overall significance level (α_E = .0167). Results are described by TRSC dimension and are provided in Table 2.

Results: Repeated Measures

For all dimensions, the assumption of spherecity was met according to Mauchly's test of sphericity. Results of RM ANOVAs are reported in Table 2.

One dimension, School Problems, indicated no significant differences in scores over time (F (2, 454) = 1.12, p= .326). Significant differences were found among Adaptability scores (F (2, 454) = 7.68, p= .001), Externalizing Behaviors (F (2, 454) =3.90, p= .021), and Internalizing Behaviors (F (2, 454)= 17.31, p< .001), indicating change in dimensional ratings over time. Post-hoc analyses in the form of paired t-tests were conducted to determine where changes occurred. For Adaptive Skills, there was no significant change between first and second grade scores, but a significant decrease in Adaptive Skills ratings between second and third grade ratings (t (227) = 3.67, p <.001). Internalizing Behaviors showed a decrease in ratings between first and second grade (t(227) = 5.30, p<.001), but no change between second and third grade ratings. Externalizing problems showed a similar pattern to Internalizing Problems, significant decrease in ratings between first and second grades (t(227) = 2.68, p = .008), but no change in ratings among second and third grades.

Study 2: Latent Growth Curve Analysis

The main shortcoming with repeated measures ANOVA is that this method creates one omnibus model to describe change among a data set; any one subject's individual differences are masked by the analysis procedure. A newer person-oriented methodological approach, Latent Growth Curve Modeling (LGM) overcomes the primary shortcoming by allowing each

individual's developmental trajectory to be mapped (Duncan, et al, 1999; Rakov & Marcoulides, 2000). This methodology is similar to creating regression lines for each individual measuring the latent constructs over time. LGM allows for the notion that although people develop in the same manner, the individual differences unique to any one person's development are both meaningful and important to understand (Rakov & Marcoulides, 2000). Further, LGM can gain an understanding of change in latent variables at the both the group and individual level by incorporating both means and covariances into analyses (Duncan et al., 1999).

LGM analyses were used to identify the average trajectory for each of four latent constructs assessed by the TRSC. Each dimension was tested separately using a two factor latent growth model with intercept and shape factors which measured rate of change over the three time ratings (1^{st}, 2^{nd}, 3^{rd} grades) and is pictured in Figure 1. The intercept factor represents initial status or baseline information about the characteristic under study and the mean status among subjects can be found (μ_I). The variance of this factor (Di) describes the variability of individuals' baseline values (Duncan et al., 1999). The shape factor details how individuals' scores change over time (μ_S) and deviations from the overall amount of change are defined by the variance of the shape factor (Ds). Any one individuals' unique pattern of growth may deviate from the baseline and change information. Error variances among the three time points were constrained to be equal.

A series of LGM models were tested. The two factor LGM model was first tested for linear growth (Duncan et al., 1999); suggesting that straight line development exists for the tested dimension. Next, the same two factor model was tested, allowing for non-linear growth. A Chi-square difference test determined if model fit was significantly improved by allowing for non-linear patterns of growth rather than assuming that growth was linear. Third, the two factor

model was tested using a multigroup approach to determine average trajectory differences by risk grouping. To aid in discussion, results are described for each TRSC dimension separately.

LGM analyses were conducted with LISREL 8.51 (Jöreskog & Sörbom, 1996). Model fit was evaluated by examining the significance of model parameters, as well as the overall model χ^2 and its p-value to assess goodness of fit between the model and data. Additional indices of model fit were examined: Root Mean Square Error of Approximation (RMSEA) and accompanying 90% CI, with values of (or capturing) .05 indicating "close" fit of the model to the data (Anderson & Gerbing, 1993); the Non Normed Fit Index, where values greater than .95 indicated acceptable fit; and the Standardized Root Mean square Residual (SRMR) was used to give a sense of the amount of error in the model, with values under .05 considered acceptable.

Results: Latent Growth Curves

Internalizing Problems

Table 3 provides the LGM results for the Internalizing Problems dimension and Figure 2 illustrates the developmental pathways. This dimension measured the extent to which teachers thought that a child felt anxiety, depression, or suffered from somatic complaints during first through third grades. When a linear trend was imposed upon the LGM, the average initial Internalizing Problems measure was reported to be close to the T-score mean of 50, and the slope indicated that average child scores were lower, exhibiting fewer Internalizing Problems as the children progressed. The intercept variance for Internalizing Problems indicated substantial variation among initial status of Internalizing problems (D_I = 39.39, t=9.04, p<.001). However, the variance of the shape factor was not significant, showing little variability among individuals' rates of change. Model fit showed that a model of linear growth was a poor approximation to the data ($\chi^2_{(3)}$ = 20.54, p<.001; RMSEA = .16, NNFI = .78, SRMR = .11).

Model fit was improved by allowing for a non-linear trajectory of change in Internalizing Problems scores ($_{\Delta}\chi 2$ (1) =14.40). As seen in Table 3, model ad hoc fit indices were closer to acceptable levels. Investigation of a non-linear representation showed that the Internalizing Problems scores were decreasing as children aged, but at a faster rate than with the linear model (-3.86, t= -5.44, p<.001).

Finally, differences between high and low risk students were investigated. As expected, the lower risk students had a much lower initial status (μ_I =45.43) than did higher risk students (μ_I = 56.23). Baseline differences were significant for the higher risk group, showing individual differences in initial scores among students and this group also showed higher random error (98.80) than lower risk students. Lower risk students had similar intercept or baseline scores, but significantly differed from each other in the rate of change. From the average initial status, students in the higher risk group fell at a faster rate (-4.75) than did students in the lower risk group (-2.61). Global fit information for the multigroup model showed a poor overall approximation to the data ($\chi 2$ (4) = 17.94, p<.001, RMSEA = .17, NNFI = .77, SRMR = .07).

Adaptive Skills

Table 4 provides the results for the Adaptive skills dimension, which measures the extent to which children were able to adapt to the primary school environment. Figure 3 outlines the developmental pathways for the Adaptive Skills scale. The linear LGM, showed the average initial Adaptive skills status of approximately 53 with a negative slope, illustrating a decrease in Adaptive skills scores over grade levels. Model fit showed that a linear model was an adequate approximation to the data ($\chi 2$ (3) = 5.55, p=.14, RMSEA = .06, NNFI = .99, SRMR = .03).

As seen by the non-significant Chi-square difference test, not much was gained by allowing for a non-linear trajectory LGM of Adaptive Skills scores ($_{\Delta}\chi 2$ (1) =1.16) and model fit indices were close to those reported for a linear model. Allowing for a non-linear trajectory showed that Adaptive skills scores were still decreasing, but that the rate of change was not significant (-.17, t= -.40, p >.05). Baseline differences were significant, showing differences in students' initial Adaptive skills status.

Finally, differences between high and low risk students were investigated for the Adaptive Skills dimension. The model showed estimation problems with the higher risk group; and preliminary results are only presented for descriptive purposes. As expected, low risk students had much higher initial Adaptive Skills scores (56.68); however, scores decreased over time (-1.55) . There was also significant variability in initial status and rate of change. Average initial status was much lower for higher risk students (46.12), with a significant rate of decline (-1.27), and higher error levels.

School Problems

Table 5 provides the results for the School Problems dimension and Figure 4 details the developmental pathways. This dimension measures the extent to which children are thought to show problems with attention and learning. With a linear LGM, the model showed estimation problems. Allowing for a non-linear trajectory of the School Problems dimension allowed for an acceptable fitting model ($\chi 2$ (2) = 3.29, p=.14, RMSEA = .06, NNFI = .99, SRMR = .03).

The non-linear LGM showed that the initial baseline was close to the average T-value, 49.05, with little decline or decrease in School Problem scores as students advanced (-0.17). However, the change factor was not significant, suggesting the relative stability of School Problem scores over the time points.

Differences between high and low risk students were investigated. Again, the LGM for the higher risk students did not converge, and results are only presented for descriptive purposes. As expected, lower risk students had lower initial learning problems scores (45.43) which remained relatively constant over time (0.06). For lower risk students, there was significant variability among students' initial status, and also rate of change. While the model did not converge for high risk students, their initial Learning Problems status was much higher (55.89) with Learning Problems scores decreasing (-0.26) as students advanced to the next grade.

Externalizing Behaviors

Results are not presented for any of the Externalizing Behaviors LGM models. All of the LGM models tested (linear, non-specified, multigroup) showed serious problems with parameter estimation and models converging. Further investigation needs to be conducted with Externalizing scores to determine why LGM techniques were not successful.

Discussion

The current study investigated 228 students over three years to determine change in behavioral constructs through various analysis strategies. This study was unique because it used newer statistical techniques to investigate child development characteristics with a longitudinal and person-oriented approaches. This is of interest to determine if each of the four studied dimensions may be thought of as relatively stable over time or show evidence of predictable patterns of change. Greater understanding the behavior of these developmental constructs will help researchers, teachers, and school administrators understand behavioral development in primary school.

It was hypothesized that Internalizing Problems and Externalizing Behaviors dimensions would be stable. RM ANOVAs showed differences among mean ratings for both of these scales, with decreases in ratings occurring between first and second grade. While the Externalizing Behaviors dimension could not be tested with LGM techniques, the Internalizing Problems dimension was not constant, but was able to fit a non-linear trajectory of change during first through third grades.

The overall trajectory for Internalizing Problems showed that children's scores decreased from the initial baseline over time in a non-linear fashion. Internalizing ratings decreased regardless of student level of risk, both higher and lower risk students were rated as exhibiting fewer problems as grade level increased. Students may have increased anxiety when starting school in first grade and as school becomes routine, some of the anxiety pressures may be alleviated.

We also did not know how the Adaptive Skills and School Problems average developmental trajectories would be expressed. Adaptive skills ratings also showed decreasing scores over time, but the rate of change was not significant. The non-significant score suggests that other methods of examining change (panel analysis, repeated measures) may be just as effective as LGM. A decrease in Adaptive skills ratings suggests that students are actually seen as less adaptable and studious over time. This could be due to peer pressures to not perform well academically and/or reinforcement from peers for exhibiting non-adaptive behaviors, even as early as in the primary grades.

School problem ratings also remained constant over time, suggesting no real advantage of LGM. Considering ratings, students with learning problems don't change quickly over a span of a few years time. What is encouraging is that although higher risk students did have higher

initial status scores, these students still showed decreases over time. These results suggest that even higher risk students can change their behaviors and overcome problems with school. What is promising is the results showing that students can reduce the amount of school problems that they exhibit, suggesting need to target students of higher risk early in elementary school.

One of the major limitations of the present study is sample size. A greater number of subjects are desirable to produce stable estimates for the LGM parameters. If more subjects are included, gender differences with in level of risk categories may be investigated as well as relationship of the dimensions to outcome measures such as academic achievement indices, number of absences or suspensions.

Additionally, it is recognized that the classification system to group children into high and low levels of risk was crude classification system. An optimal methodology strategy would be to employ a mixture modeling approach where first Latent Class Analysis (Muthén, 2001) is conducted to determine if populations underlie students beginning elementary school and then fit LGMs according to each of the classes. Differences in the descriptive information showed great differences among ratings for higher and lower risk groups and initial evidence is thought to support employing analyses according to level of risk, even though not all LGMs properly converged to stable estimates. Some of the estimation problems were thought to arise from the wide range of scores in the higher risk group. If this heterogeneous group could be divided into smaller subsets representing different types of higher risk, then LGM models may be more effective.

This study investigated the growth patterns for four behavioral dimensions encountered by children as they transition through primary school. It served as an initial investigation of the development of average trajectories or chreods of development for the normal population of

primary school children. This study provided support that these dimensions do change over time, however, the rates of change differed depending on the dimension. Additionally, it suggested that the average trajectories differ for different groups. This may lend support to Waddington's notion of a finite number of developmental paths. This study may be used as a prototype to model developmental aspects of "at risk" children such as children parentally exposed to drugs, or with behavioral/psychological disorders (e.g. ADHD) and it provided initial insight as to how child developmental behaviors change or remain constant over time.

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Table 1. Descriptive Statistics of the Four BASC TRSC Dimensions

	Grade 1	Grade 2	Grade 3
Adaptive Skills			
Low Risk (N=150)	56.55 (10.98)	55.87 (9.16)	54.19 (9.19)
High Risk (N=78)	45.81 (8.40)	45.53 (9.87)	43.42 (8.33)
Total (N=228)	52.87 (11.36)	52.33 (10.60)	50.51 (10.23)
Internalizing Behaviors			
Low Risk (N=150)	46.47 (7.77)	43.31 (5.19)	43.08 (6.76)
High Risk (N=78)	56.28 (11.03)	51.63 (10.18)	52.51 (11.75)
Total (N=228)	49.83 (10.13)	46.15 (8.28)	46.31 (9.84)
Externalizing Behaviors			
Low Risk (N=150)	45.73 (6.11)	44.60 (4.84)	44.65 (5.48)
High Risk (N=78)	58.14 (9.03)	55.87 (12.06)	56.50 (9.43)
Total (N=228)	49.97 (9.33)	48.46 (9.67)	48.71 (9.03)
School Problems			
Low Risk (N=150)	45.43 (9.48)	45.01 (7.39)	45.96 (7.41)
High Risk (N=78)	56.28 (9.23)	55.04 (9.99)	55.35 (8.35)
Total (N=228)	49.14 (10.71)	48.44 (9.62)	49.17 (8.91)

Notes: TRSC scores have been normed to M =50, SD=10; Mean (Standard Deviation) provided.

Table 2. Repeated Measures ANOVA Results for BASC TRSC Dimensions

	Omnibus Test		Paired Sample t-Tests		
	F	**Sig.**	**t**	**df**	**Sig**
Adaptive Skills	7.677	.001*			
Year 1 to Year 2			.813	227	.417
Year 1 to Year 3			3.673	227	<.001**
Year 2 to Year 3			3.108	227	.002**
Internalizing Beh.	17.309	<.001*			
Year 1 to Year 2			5.297	227	<.001**
Year 1 to Year 3			4.784	227	<.001**
Year 2 to Year 3			-.223	227	.824
Externalizing Beh.	3.902	.021*			
Year 1 to Year 2			2.676	227	.008**
Year 1 to Year 3			2.170	227	.031
Year 2 to Year 3			-.419	227	.675
School Problems	1.122	.326			

Notes: df for Omnibus tests = (2, 454); df for paired t-tests = (227). Starred Omnibus tests significant at $\alpha = .05$, Starred Paired T-tests significant at experimental controlled $\alpha = .0167$.

Table 3 . LGM: Internalizing Problems Dimension

			Risk Grouping	
	Linear	Non-Linear	Lower	Higher
Latent Means				
Intercept	49.19*	49.79*	45.43*	56.23*
Shape	-1.76*	-3.86*	-2.61*	-4.75*
Variances				
Intercept	39.39*	47.84*	-3.45	26.82*
Shape	3.60	4.74	-75.98*	-44.97
Correlation between				
Intercept & Shape	-4.91	-13.74	-24.79*	16.83
Error Variance	54.57	55.64	55.05	98.80
Model Fit				
$\chi 2$	20.54	7.14	17.94	
df	3	2	4	
p	.00	.03	.00	
RMSEA	.16	.11	.17	
(90% CI)	(.10 - .23)	(.03 - .19)	(.09 - .26)	
NNFI	.78	.90	.77	
SRMR	.11	.09	.07	
$\Delta\chi 2$ (Δdf)		14.40 (1)*		

Note: Starred values significant at $p < .05$, Critical value $\chi^2_{(1)} = 3.85$

Table 4. LGM: Adaptive Skills Dimension

			Risk Grouping	
	Linear	Non-Linear	Lower	Higher
Latent Means				
Intercept	53.08*	49.05*	56.68*	46.12*
Shape	-1.18*	-0.17	-1.55*	-1.27*
Variances				
Intercept	80.18*	81.75*	85.73*	20.61*
Shape	1.62	5.01*	32.15*	-14.40
Correlation between				
Intercept & Shape	-5.68	-15.50*	-33.52*	12.40
Error Variance	44.29	32.98	33.83	56.21
Model Fit				
$\chi 2$	5.55	3.89		
df	3	2		
p	.14	.14		
RMSEA	.06	.06		
(90% CI)	(0 - .14)	(0 - .16)		
NNFI	.99	.99		
SRMR	.03	.03		
$\Delta\chi 2$ (Δdf)		1.66 (1)		

Note: Starred values significant at $p < .05$, Critical value $\chi^2_{(1)} = 3.85$, Higher risk group Non-P.D. Global fit for multigroup model not reported due to estimation problems.

Table 5. LGM: School Problems Dimension

			Risk Grouping	
	Linear	Non-Linear	Lower	Higher
Latent Means				
Intercept	48.90*	49.05*	45.43*	55.89*
Shape	0.02	-0.17	0.06	-0.26*
Variances				
Intercept	76.62*	81.75*	65.65*	44.16*
Shape	0.36	5.01	17.76*	-2.13
Correlation between				
Intercept & Shape	-8.23	-15.50	-26.32*	-0.70
Error Variance	34.88	32.98	24.49*	49.47
Model Fit				
$\chi 2$		3.29		
df		2		
p		.14		
RMSEA		.06		
(90% CI)		(0.0 – 0.16)		
NNFI		.99		
SRMR		.03		

Note: Starred values significant at $p < .05$, Critical value $\chi^2_{(1)} = 3.85$, Low group N.P.D.

Global fit for multigroup model not reported due to estimation problems.

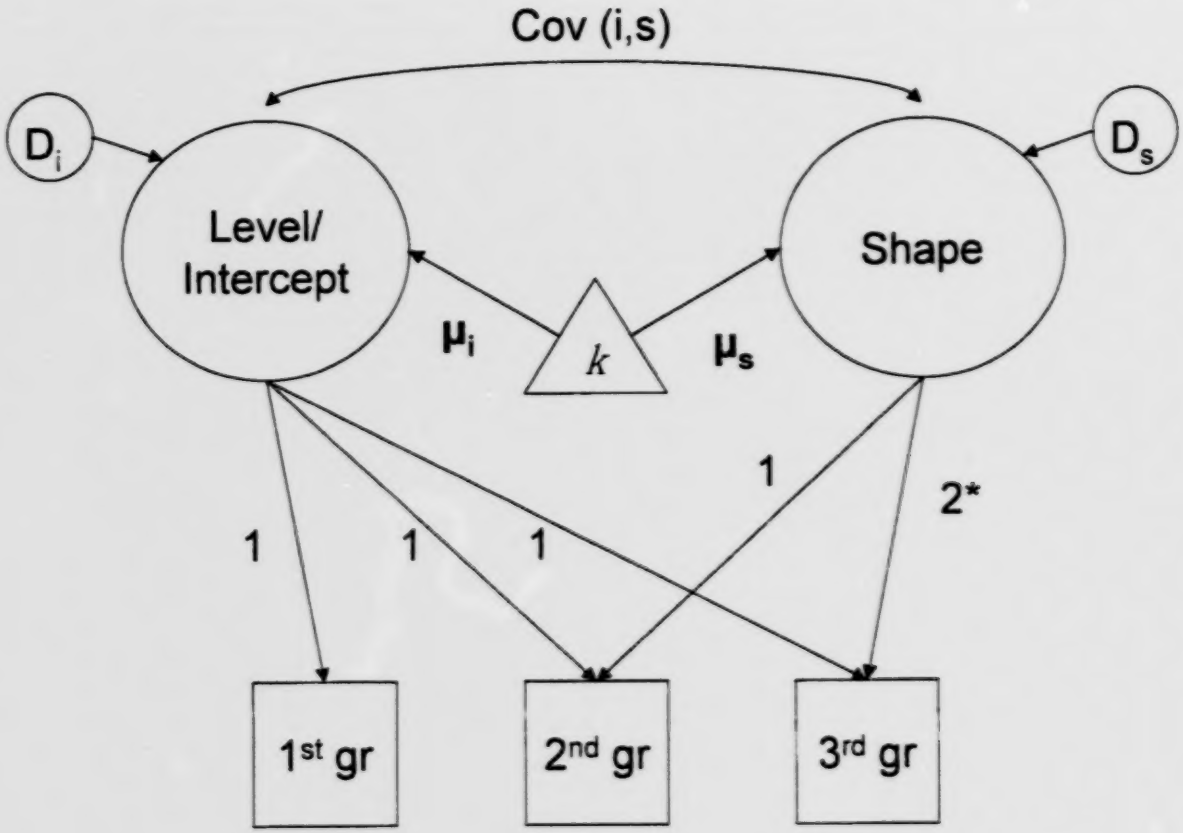
Captions for Figures

Figure 1. Latent Variable Growth Model

Figure 2. LGM Graph of Internalizing Problems Developmental Pathways

Figure 3. LGM Graph of Adaptive Skills Developmental Pathways

Figure 4. LGM Graph of School Problems Developmental Pathways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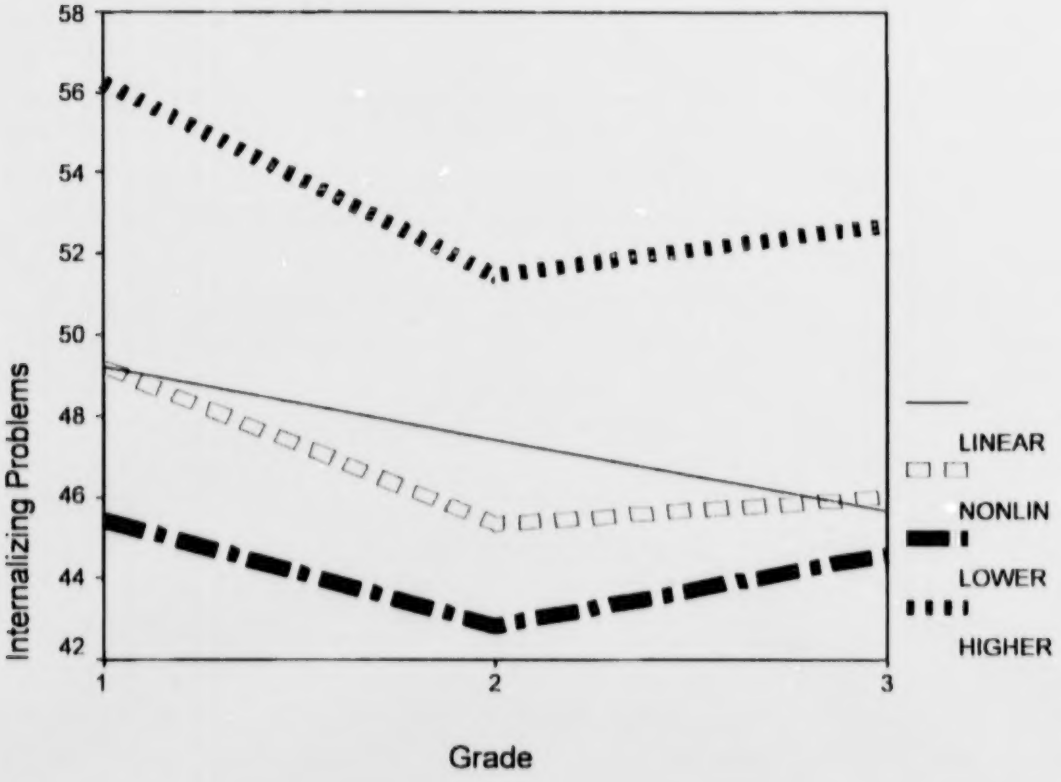

Figure 2. LGM Graph of Internalizing Problems Developmental Pathways

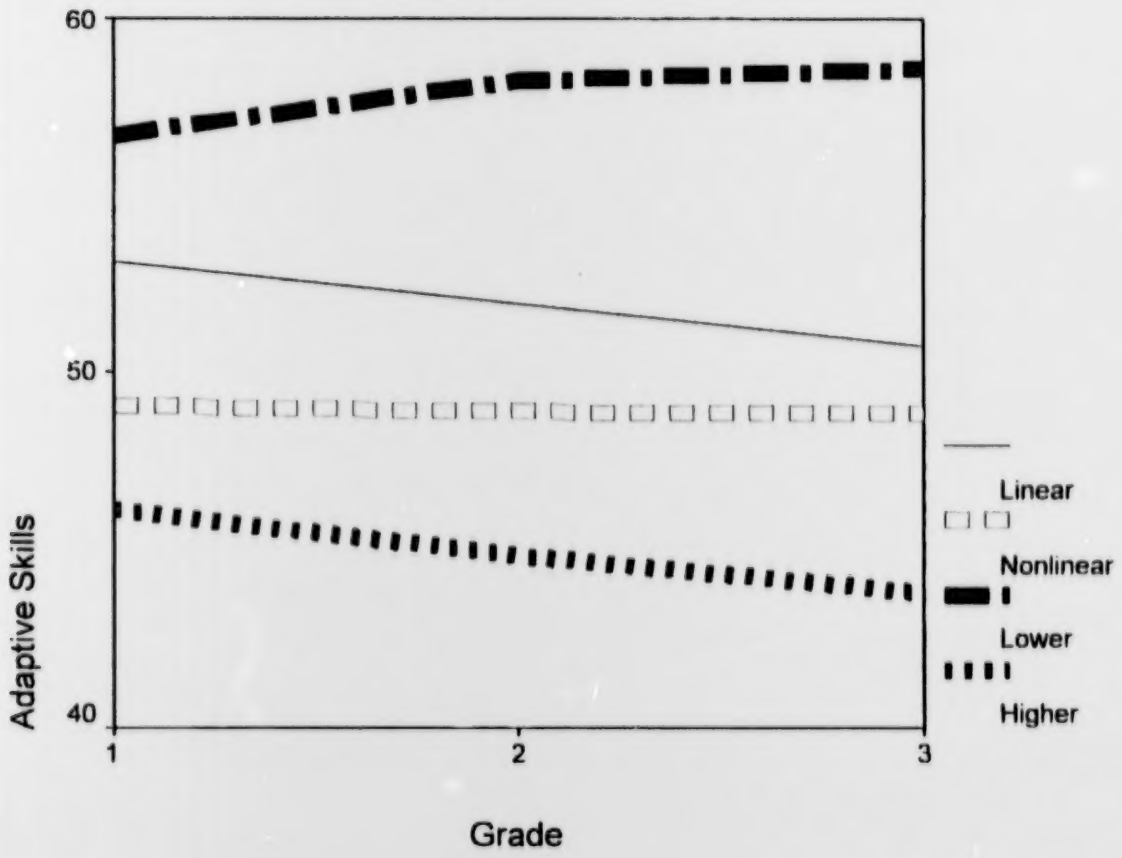

Figure 3. LGM Graph of Adaptive Skills Developmental Pathways

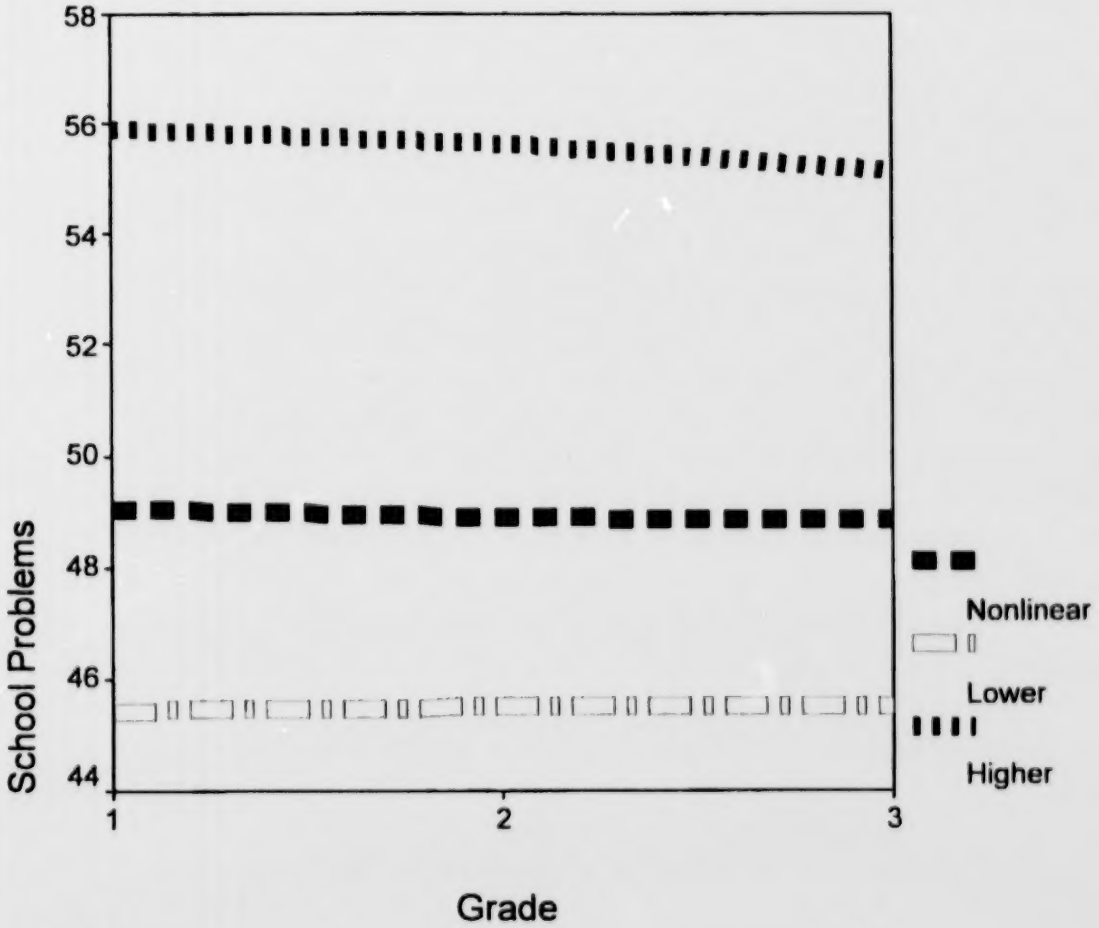

Figure 4. LGM Graph of School Problems Developmental Pathways

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